§7.5 Strategy for Integration

Table on page 495 has the "basic" forms.
Memorize the forms 1-18.

Integration checklist:

(1) If a basic form, then do it.

(2) Simplify into a basic form?

(3) Simple substitution to a basic form?

(4) Apply a technique?

Recall:

<u>IBP</u>

$$\int (t^3+2t)\sin(3t)\,dt, \quad \int \frac{x^2}{e^x}\,dx$$

$$\int \tan^{-1}(x)\,dx, \quad \int x^2 \ln(x)\,dx$$

$$\int e^{ax}\sin(bx)\,dx, \quad \int \sec^3(x)\,dx$$

<u>Trig. Integrals</u>

$$\int (\text{trig. functions})\,dx$$

<u>Trig. Sub.</u>

$\sqrt{x^2 \pm a^2}$, $\sqrt{a^2-x^2}$ in integrand

P.F.D. (Partial Fraction Decomposition)

$$\int (\text{Rational function})\, dx$$

Other

Rationalizing sub., problems 59-63 on page 493 (substitute $t = \tan(\frac{x}{2}) \Rightarrow$ converts a trig. integral into a P.F.D.)

Some hints on problems from page 499:

#2) simple sub $u = 3x+1$

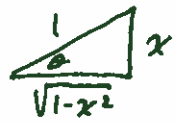
#6) simple sub $u = 2x+1 \Leftrightarrow x = \frac{1}{2}(u-1)$

#8) IBP and note $\sin(t)\cos(t) = \frac{1}{2}\sin(2t)$

#10) PFD

#14) Simple sub $u = 1+x^2 \Leftrightarrow x^2 = u-1$

#16) Trig. sub.



$x = \sin(\theta)$

#22) Let $u = \ln(x) \Leftrightarrow x = e^u$, then $w = 1+u^2$

#24) Long division

#28) Rationalizing sub $u = \sqrt{at} \Leftrightarrow t = \frac{1}{a}u^2$ then IBP.